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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,955	11/13/2001	Sten Lindau	19391.0028	6525

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Edward A Pennington
Swidler Berlin Shereff Friedman
Suite 300
3000 K Street NW
Washington, DC 20007-5166

EXAMINER

LEE, SHUN K

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 02/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/914,955	Applicant(s) LINDAU, STEN	
	Examiner Shun Lee	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1201</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

National Stage Application

1. The Examiner acknowledges consideration of the International Preliminary Examination Report in International Application PCT/SE00/00470. MPEP § 1893.03(e).

Drawings

2. The drawings are objected to as failing to comply with PCT Rule 11.13(l) (*i.e.*, reference signs (2', α ', 8') not mentioned in the description shall not appear in the drawings, and vice versa; see MPEP § 1825). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

3. The claims are objected to because they include reference characters which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

4. Claim 8 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 7 recites the

limitation the grating interval varies according to $d(x) = \lambda/(n - \sin\alpha_{0\max}(x))$. It should be noted that the grating interval varies non-linearly (according to the formula

$d(x) = \lambda/(n - \sin\alpha_{0\max}(x))$) from the centre out towards the edges. Dependent claim 8 recites the limitation the grating interval is given by $d(x) = (\lambda/n)(1 + (D/2nS) + (x/nS))$, that is the grating interval varies linearly from the centre out towards the edges.

However the dependent claim fails to include every limitation of the claim from which it depends, since a linearly varying grating interval limitation fails to include the limitation of a non-linearly varying grating interval. Thus the improper dependent claim can be infringed by a linearly varying grating interval which would not infringe the basic claim. Therefore, the dependent claim fails to include every limitation of the claim from which it depends (see MPEP § 608.01(n) and 37 CFR 1.75).

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 10, the phrase "preferably" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Regarding claim 4, the phrase "for example" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 9 recites the limitation "where the higher values within both areas are related to each other and the lower values within both areas are related to each other" which is vague and indefinite since the form of the relationship(s) are not particularly pointed out and distinctly claimed.

7. Claims 7 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: x, D, and S to other elements.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-5, 6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee *et al.* ("Quantum well infrared photodetectors with bi-periodic grating couplers", Appl. Phys. Lett., Vol. 61, no. 20 (16 November 1992), pp. 2437-2439) in view of Morgan (US 5,056,889) in so far as understood.

In regard to claims **1-3** and **6**, Lee *et al.* disclose a quantum well based two-dimensional detector (pg. 2437, right column, second paragraph) for detecting infrared radiation which receives infrared radiation falling upon its detector surface and comprising a grating arrangement (pg. 2437, left column, last paragraph) for diffraction of the incident radiation, characterized in that the grating arrangement is selected with a grating interval which varies or changes from the central part of the detector out towards the outer parts or circumference of the detector (pg. 2437, left column, last paragraph). While Lee *et al.* also disclose (pg. 2439, left column, first paragraph) that the grating arrangement provides better uniformity across the wafer, the detector of Lee *et al.* lacks that the variation or change in the grating interval is arranged (e.g., varying linearly such as increasing with distance or in steps) to retain or contribute towards retaining in the detection diffracted rays of the orders 1 and -1 as active components across the whole detector surface by changing the angle values of the diffracted rays depending upon the angles of incidence α in relation to the normal to the surface of the radiation falling on the various parts of the detector surface. However, diffraction by a grating is well known in the art. For example, Morgan teaches (column 3, lines 36-42) that the first order (*i.e.*, orders 1 and -1) diffracted beam direction should be parallel to the layer structure and is dependent on both radiation incidence angle and grating period. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to arrange the grating periods in the detector of Lee *et al.* depending on the expected radiation incidence angles, in order that the first order (*i.e.*, orders 1 and -1) diffracted beam direction should be parallel to the layer structure.

In regard to claim **4** which is dependent on claim 1, Lee *et al.* also disclose (pg. 2437, right column, first paragraph) that elements incorporated in the grating arrangement in the horizontal section of the grating arrangement vary the configuration size and/or shape (see also Fig. 3).

In regard to claim **5** which is dependent on claim 1, Lee *et al.* also disclose (pg. 2439, left column, first paragraph) that the interval of the grating arrangement is selected so that the detection or sensitivity of the detector is essentially the same over the whole surface 1a of the detector.

In regard to claim **9** which is dependent on claim 1, Lee *et al.* also disclose (pg. 2438, right column, last paragraph) that the grating interval has values of e.g., 2.67 μm and 2.95 μm (*i.e.*, approximately 2.5-3.0 micrometers to approximately 3.0-3.5 micrometers).

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee *et al.* ("Quantum well infrared photodetectors with bi-periodic grating couplers", Appl. Phys. Lett., Vol. 61, no. 20 (16 November 1992), pp. 2437-2439) in view of Morgan (US 5,056,889), Norton (US 5,373,182), and Applicant's Admitted Prior Art in so far as understood.

In regard to claim **10**, Lee *et al.* in view of Morgan is applied as in claim 1 above. The detector of Lee *et al.* lacks that it is packaged as a camera system which further comprises optics, aperture, and cooling unit. However, camera system components are well known in the art. For example, Norton teaches (Fig. 4) that a camera system (40) comprises optics (42), aperture (41, 48), and cooling unit (44). As another

example, applicant admits (pg. 5, line 35 to pg. 6, line 15) as Prior Art that a camera system comprises optics, aperture, and cooling unit are known and incorporated in a known way. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to package the detector of Lee *et al.* with optics, aperture, and cooling unit for use as a camera system.


Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878